

Musculoskeletal disability among elderly people in the community

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Musculoskeletal conditions are a major cause of physical limitation and disability in elderly people,^{1,2} and the prevalence of these conditions is expected to rise dramatically as the population ages.³ Impairment of physical function among older people has been shown to have a greater influence on level of disability and ability to continue independent living than either sight or hearing impairments.⁴

Several studies have shown that detailed assessment of elderly people and intervention to improve their general health and physical function may increase their independence, emotional well-being and life expectancy.⁵⁻⁸ However, functional impairment and musculoskeletal disability are often underestimated or overlooked when elderly people attend their doctor for other reasons.^{9,10}

In 1991 we surveyed elderly people living independently in the Northern Sydney Area (the region of the Northern Sydney Area Health Service) to identify the prevalence of self-reported chronic illnesses and conditions, levels of physical disability and the main factors associated with disability. The Northern Sydney Area extends from Sydney Harbour north to the Hawkesbury River. It has a base population of 730 750 residents and above-average socioeconomic status, education levels and mortality rates compared with the New South Wales population.

Abstract

Objectives: To determine the prevalence and determinants of disability among elderly people living in the community.

Design: A cross-sectional postal questionnaire survey.

Setting: Northern Sydney Area Health Service.

Participants: 1527 residents (622 men and 905 women) aged 65 years and over.

Main outcome measures: Self-reported chronic illnesses, injuries or conditions; difficulties with activities of daily living assessed by the Health Assessment Questionnaire (HAQ); and home modification and use of functional aids.

Results: "Arthritis or rheumatism" was the leading long term condition, reported by 59.5%, 55.8% and 59.7% of women and 40.5%, 47.0% and 43.6% of men in the three age groups (65-74, 75-84 and 85 years and over), respectively. The back, neck and knees were the most common sites of pain and stiffness. Of the respondents, 23.4% of women and 24.3% of men reported regularly taking non-steroidal anti-inflammatory drugs. Impaired performance of activities of daily living increased with age, with 53.9%, 70.7% and 89.6% of women and 37.6%, 63.6% and 73.2% of men in the respective age groups reporting at least some difficulty (HAQ score > 0). Multivariate analysis found self-reported poor general health, loss of a limb, arthritis or rheumatism, other long term conditions restricting physical activity, impaired vision, female sex, and age to be significant predictors of disability as measured by HAQ scores. Only 13.9% of women and 9.4% of men had made changes to their home. Functional aids were used by 27.7%, 37.3% and 65.9% of women and 15.6%, 33.4% and 59.1% of men in the respective age groups.

Conclusion: Arthritis and rheumatism were the most prevalent chronic conditions among elderly people in the community, and were significantly associated with difficulty with performing activities of daily living, after controlling for effects of age, sex and other chronic conditions.

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Methods

Sample

During 1991 a postal questionnaire was sent to a random sample (drawn from electoral rolls) of 4030 residents aged 65

years and over not living in a nursing home or other institution in the Northern Sydney Area. People aged 65 years and over make up 13.7% of the base population of the Northern Sydney Area, which is above the 10.2% average for New South Wales.¹¹

Approval was given by the Northern Sydney Area Medical Research Ethics Committee at Royal North Shore Hospital.

Questionnaire

The questionnaire, entitled "Health and disability in the elderly", did not specifically mention arthritis or musculoskeletal disorders in the covering letter or explanatory notes. It included

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1: Self-reported health status and prevalence of chronic conditions, by age and sex (results are given as mean percentages [95% confidence interval])

	Women			Men		
	65-74 years	75-84 years	85+ years	65-74 years	75-84 years	85+ years
"Good" general health	61.0 (55.5-66.5)	47.4 (42.5-52.3)	35.8 (25.1-46.5)	61.7 (56.2-67.2)	42.4 (37.5-47.2)	37.2 (26.4-48.0)
Arthritis/rheumatism	59.5 (54.0-65.1)	55.8 (50.9-60.7)	59.7 (48.8-70.7)	40.5 (34.4-46.6)	47.0 (40.9-53.0)	43.6 (28.0-59.2)
Hearing problems/deafness	14.9 (10.8-18.9)	25.5 (21.2-29.8)	49.4 (38.2-60.5)	32.4 (26.6-38.2)	39.2 (33.4-45.1)	43.6 (28.0-59.2)
Other chronic conditions limiting physical activity*	22.1 (17.4-26.8)	26.5 (22.2-30.9)	26.3 (16.4-36.2)	26.3 (20.8-31.8)	38.3 (32.2-44.3)	41.0 (25.6-56.5)
Poor vision/blindness	11.2 (7.6-14.7)	22.5 (18.4-26.6)	29.9 (19.6-40.1)	13.0 (8.8-17.1)	19.6 (14.8-24.4)	35.9 (20.8-51.0)
Memory loss/mental disability	6.3 (3.5-9.0)	9.1 (6.3-11.9)	24.7 (15.0-34.3)	8.1 (4.7-11.5)	15.5 (11.2-19.9)	25.6 (11.9-39.3)
Loss of limb or other body part	1.7 (0.2-3.1)	5.1 (2.9-7.2)	6.5 (1.0-12.0)	2.4 (0.5-4.3)	4.2 (1.8-6.6)	5.1 (0.6-17.3)

*Includes cardiovascular and respiratory disease.

questions drawn from general health surveys (the Australian Disability Survey of 1988² and the Calderdale Disability Study conducted in the United Kingdom during 1989¹²) and the Health Assessment Questionnaire (HAQ)¹³ to assess ability to perform activities of daily living. Sociodemographic questions were also included to allow comparison between the sample data and the Australian Bureau of Statistics 1991 Census data available for the base population.

Respondents were asked to report whether they had any long term illnesses, injuries or conditions. The available options were "poor vision or blindness", "arthritis or rheumatism", "hearing problems or deafness", "loss of memory or mental disability", "loss of limb or other part of the body" and "other chronic conditions limiting physical activity or work".

Subjects were also asked to list any medications they took regularly, together with the conditions for which they were taking them.

The HAQ assesses eight daily functional activity categories: hygiene, meals and eating, walking, dressing and grooming, reaching for objects, grip, getting out of bed or a chair, and housework and shopping (each containing two or three items).¹³ Each question requires one of the responses "without any difficulty" = 0, "with some difficulty" = 1,

"with much difficulty" = 2, or "unable to do" = 3. According to standard methods,¹⁴ the individual scores were adjusted to "with much difficulty" if the respondents indicated that they had used a functional aid. The final score was an average of the highest scores in each category, yielding a continuous measure ranging from 0 to 3.

Respondents were asked if they had made any changes to their home and were asked to indicate any functional aids they used from a list of 10 common aids.

Statistical analysis

SAS statistical software¹⁵ was used for descriptive statistics, calculating HAQ disability scores and stepwise regression analysis. All variables identified on univariate analysis to be associated with higher levels of disability, as measured by the HAQ score, were considered in multiple regression models.

Survey results are presented for age- and sex-specific categories as frequencies with 95% confidence intervals. For an overall description of the population, and for results that did not vary much across the age groupings, an adjusted percentage has been calculated allowing for the sampling fraction of the age groups using the 1991 Census data for the base population. These include the overall use of non-steroidal anti-

inflammatory drugs (NSAIDs), musculoskeletal symptoms in Box 2, and frequency of home modifications.

Results

Respondents

Replies were received from 1527 elderly people (622 men and 905 women) — a 1.5% sample of those aged 65 years and over in the Northern Sydney Area. Excluding those who had died or were now living in a nursing home, the response rate was 45% after a single mailing. Forty-two per cent of respondents were aged 65 to 74 years, 49% were aged 75 to 84 years, and 9% were aged 85 years and over. The distribution of men and women in the study population was similar to that of the base population, but the 75 to 84 years age group was over-represented.

Overall, 60% of respondents were living in a separate house and 23% in self-contained home units. Thirty-three per cent reported that they lived alone. Most were Australian born (72%) and spoke English at home (93%). These demographic features were not significantly different from those in the base population (ABS Census 1991), and were consistent across age and sex groups. Self-reported health status was similar among men and women and showed some deterioration with age (Box 1).

Physical disability

"Arthritis or rheumatism" was the leading long term condition reported, followed by hearing impairment, and other chronic conditions limiting physical activity (which included all cardiovascular and respiratory disorders).

A majority of both women (67.2%, 69.7% and 70.1%) and men (59.3%, 62.6% and 62.8%) in all three age groups reported musculoskeletal symptoms, including pain, swelling or stiffness in peripheral joints or spine. The most common sites were the back and neck (Box 2).

2: Musculoskeletal symptoms (most common sites reported)

	Women (n=905)	Men (n=622)
Back	49.7%	42.7%
Neck	40.5%	36.1%
Knees	26.7%	25.3%
Hands or fingers	26.0%	16.1%
Shoulders	20.8%	17.6%
Feet or toes	12.2%	14.1%

Percentages (adjusted for age-group sampling) do not sum to 100 because respondents reported symptoms at more than one site.

Medication

A majority of respondents were taking medication regularly (73.8%, 82.0% and 77.6% of women and 73.1%, 84.6% and 79.1% of men in the three age groups, respectively), most commonly for cardiovascular conditions. Overall, 23.4% of women and 24.3% of men reported frequently taking non-steroidal anti-inflammatory drugs. Respondents who reported having arthritis or rheumatism were more likely than those not reporting these conditions to be taking regular medication (all types combined) ($P < 0.001$).

Activities of daily living

Difficulty performing activities of daily living, as measured by the HAQ, increased with age; 53.9%, 70.7% and 89.6% of women and 37.6%, 63.6% and 73.2% of men in the three age groups, respectively, reported at least some difficulty (HAQ score > 0).

Two-way analysis of variance, with age group, sex and HAQ scores as the variables, found a significant effect on HAQ score of sex ($P < 0.001$) and age ($P < 0.001$). Women had higher HAQ

scores than men (ie, were less independent in activities of daily living), and people in older age groups had significantly higher scores than those in the younger age groups (Box 3).

Elderly people with site-specific musculoskeletal symptoms (including back, knee and wrist pain) had significantly higher mean HAQ scores compared with those who did not have these specific complaints ($P < 0.001$). Elbow and wrist problems yielded the highest mean HAQ scores (data not shown).

The mean HAQ score was also significantly higher for participants who had arthritis or rheumatism, hearing problems, memory and mental problems, or other long term conditions limiting physical activity, and who were regularly taking medication ($P < 0.001$).

Using multiple regression analysis, we found self-reported poor general health, loss of limb, the presence of arthritis or rheumatism, other long term conditions limiting physical activity (of which cardiovascular conditions were the most frequently reported), female sex, visual impairment, and older age to be significantly and independently associated with higher HAQ scores (Box 4). Together, these variables explained about 45% of the total variation in the HAQ score.

3: Mean Health Assessment Questionnaire score, by age (in years) and sex

	Women			Men		
	65-74	75-84	85+	65-74	75-84	85+
n	368	453	82	288	290	44
Mean HAQ score*	0.35	0.58	1.1	0.19	0.51	0.74
(95% confidence interval)	(0.30-0.40)	(0.52-0.64)	(0.91-1.27)	(0.15-0.24)	(0.43-0.58)	(0.51-0.98)

* HAQ score = Health Assessment Questionnaire score (minimum = 0, maximum = 3).

4: Determinants of physical disability in the elderly, as measured by HAQ* (results of multiple regression analysis)

Variable	Coefficient (95% confidence interval)	t	P
General health†	0.35 (0.31-0.39)	16.46	0.001
Other chronic condition‡	0.34 (0.28-0.41)	10.85	0.001
Loss of limb	0.22 (0.07-0.36)	2.99	0.003
Arthritis or rheumatism	0.20 (0.15-0.25)	7.49	0.001
Female sex	0.16 (0.10-0.21)	5.76	0.001
Blindness/poor vision	0.09 (0.02-0.16)	2.49	0.013
Age	0.02 (0.016-0.024)	9.09	0.001

Number of observations: 1281

R²: 0.4486

* Health Assessment Questionnaire scores (minimum = 0, maximum = 3).

† General health: self-rated general health status (1 = good, 2 = fair, 3 = poor, 4 = very poor).

‡ Other chronic conditions limiting physical activity or work (excluding visual, hearing or memory impairment, loss of limb, arthritis and rheumatism) (eg, hypertension, ischaemic heart disease, chronic airways limitation).

Functional aids and home modification

Only a minority of elderly people (13.6% of women and 9.4% of men) had made changes to their home to increase independence with activities of daily living, and this frequency increased only slightly with age. Those in the older age groups were more likely to use functional aids or devices (27.7%, 37.3% and 65.9% of women; 15.6%, 33.4% and 59.1% of men, respectively); walking sticks, bath rails and jar openers were the most common.

People who reported some difficulty (HAQ score > 0) with their activities of daily living (899 people) were more likely to have modified their homes (19.7%; $P < 0.001$) or to use functional aids (53.5%; $P < 0.001$) than those who reported no difficulty (home modification, 2.3%; functional aids, 1.2%).

The mean HAQ score (without adjusting for use of functional aids) was significantly greater on average for all

participants using aids or devices, particularly for those who used a walking stick, jar opener or dressing aid or who had had bath rails or bath seats installed at home ($P < 0.001$) (data not shown).

Discussion

The elderly people responding to our survey reported a high prevalence of musculoskeletal symptoms and arthritis or rheumatism, confirming the findings of previous Australian studies. We also confirmed that arthritis and rheumatism are major causes of functional impairment, as assessed by self-reported difficulty with activities of daily living. In the 1991 Australian National Health Survey about 45% of persons aged 65 years and over reported arthritis or rheumatism,¹⁶ and the 1988 Australian disability survey identified musculoskeletal disorders as the major cause of disability.²

Although the prevalence of arthritis and rheumatism has been shown to rise dramatically with age, it appears to plateau once people reach their 70s,¹⁷ as our study also showed.

The prevalence estimates in our survey should be interpreted cautiously: firstly, because the response rate was low and, secondly, because people with problems may have been more likely to respond. However, the sociodemographic characteristics of the respondents were similar to the characteristics of the base population (identified by Census data). In addition, the questionnaire was not specifically targeted at musculoskeletal complaints, and the frequencies of joint symptoms and self-reported arthritis and rheumatism were similar to those in other studies among elderly people living independently both in Australia and overseas.^{16,18}

As expected, older age, the presence of arthritis or rheumatism, overall poorer level of general health, and other causes of physical impairment were significant predictors of a higher disability score, as measured by the HAQ. Self-reported general health had the greatest effect on HAQ score, after adjusting for other variables, and the mean HAQ score was also higher for those who had joint symptoms at any site (compared with those without). Our mean HAQ score for people reporting arthritis or rheumatism (mean, 0.67) was similar to that (mean, 0.52)

reported recently among osteoarthritis sufferers (mean age, 67.8 years; 68.8% women) in a population sample in the United States.¹⁹ In another US study, 36% of women with osteoarthritis, among a cohort of women 70 years and older living in the community, reported some limitations with activities of daily living.¹⁸

More women than men reported difficulty in performing their daily living activities, even after we adjusted for age, presence of arthritis or rheumatism and other medical conditions and impairments. This may be because the HAQ focuses on domestic tasks, such as preparing meals, traditionally performed by women in this age group. More disability among women has also been identified in studies in other countries.²⁰

Respondents who had modified their home or used functional aids to increase their independence in daily activities had a higher disability score on average, indicating greater physical impairment. Although there was a significant correlation between HAQ scores and action taken to modify the home or acquire functional aids or devices, many elderly people who reported difficulty with tasks of daily living (both with and without arthritis) had not taken such action.

Recent randomised controlled trials have shown that inexpensive interventions, including regular telephone contact, patient education, aerobic and balance exercises and simple analgesics (such as paracetamol), can improve physical function and reduce pain among elderly people who have arthritis and associated impairment.²¹ Longer-term benefits are likely if interventions mean that elderly people are able to continue to live independently in the community.

Further work is needed to determine ways of identifying elderly people with disability and encouraging them to seek assistance. We found the HAQ to be a short, easy-to-score, self-administered measure that may be a useful screening tool in a general practice or community setting to identify elderly people with functional impairment.

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